

WHAT IS CLAIMED IS:

1 1. A primary lithium battery comprising:
2 an anode including a lithium-containing anode active material;
3 a solid cathode including a current collector including aluminum and a cathode active
4 material in contact with the current collector; and
5 a separator between the anode and the cathode.

1 2. The battery of claim 1, wherein the lithium-containing anode active material is
2 lithium or a lithium alloy.

1 3. The battery of claim 1, wherein the current collector includes an aluminum
2 alloy.

1 4. The battery of claim 1, wherein the current collector includes a 2000 series
2 aluminum alloy, a 6000 series aluminum alloy, or a 7000 series aluminum alloy.

1 5. The battery of claim 1, wherein the current collector includes a 6000 series
2 aluminum alloy.

1 6. The battery of claim 1, wherein the current collector includes an aluminum
2 alloy including 0-0.4% by weight of chromium.

1 7. The battery of claim 1, wherein the current collector includes an aluminum
2 alloy including 0.01-6.8% by weight of copper.

1 8. The battery of claim 1, wherein the current collector includes an aluminum
2 alloy including 0.05-1.3% by weight of iron.

1 9. The battery of claim 1, wherein the current collector includes an aluminum
2 alloy including 0.1-7% by weight of magnesium.

1 10. The battery of claim 1, wherein the current collector includes an aluminum
2 alloy including 0-2% by weight of manganese.

1 11. The battery of claim 1, wherein the current collector includes an aluminum
2 alloy including 0-2% by weight of silicon.

1 12. The battery of claim 1, wherein the current collector includes an aluminum
2 alloy including less than 0.25% by weight of titanium.

1 13. The battery of claim 1, wherein the current collector includes an aluminum
2 alloy including 0-2.3% by weight of nickel.

1 14. The battery of claim 1, wherein the current collector includes an aluminum
2 alloy including 0-8.2% by weight of zinc.

1 15. The battery of claim 1, further comprising a nonaqueous electrolyte in contact
2 with the anode, the cathode, and the separator.

1 16. The battery of claim 15, wherein the nonaqueous electrolyte includes an
2 organic solvent.

1 17. The battery of claim 15, wherein the nonaqueous electrolyte includes a
2 perchlorate salt.

1 18. The battery of claim 1, wherein the cathode active material includes a
2 manganese dioxide, a CF_x , iron disulfide, or a vanadate.

1 19. The battery of claim 1, wherein the current collector is an expanded metal
2 grid.

1 20. The battery of claim 19, wherein the current collector has a yield strength of at
2 least 2.0 lb/in.

1 21. The battery of claim 19, wherein the current collector has a yield strength of at
2 least 5 lb/in.

1 22. The battery of claim 19, wherein the current collector has a tensile strength of
2 at least 5 lb/in.

1 23. The battery of claim 19, wherein the current collector has a tensile strength of
2 at least 7 lb/in.

1 24. The battery of claim 19, wherein the current collector has a yield strength of at
2 least 2.0 lb/in and a tensile strength of at least 5 lb/in.

1 25. The battery of claim 19, wherein the current collector has a yield strength of at
2 least 5 lb/in and a tensile strength of at least 7 lb/in.

1 26. A primary lithium battery comprising:
2 an anode including a lithium-containing anode active material;
3 a solid cathode including a current collector including aluminum and a cathode active
4 material in contact with the current collector, wherein the current collector has a resistivity of
5 less than 100 mΩ/cm; and
6 a separator between the anode and the cathode.

1 27. A primary lithium battery comprising:
2 an anode including a lithium-containing anode active material;
3 a solid cathode including a current collector including aluminum and a cathode active
4 material in contact with the current collector, wherein the current collector has a resistivity of
5 less than 10 mΩ/cm; and
6 a separator between the anode and the cathode.

1 28. A primary lithium battery comprising:
2 an anode including a lithium-containing anode active material;
3 a solid cathode including a current collector including an aluminum alloy and a
4 cathode active material including a manganese dioxide in contact with the current collector;
5 a separator between the anode and the cathode; and
6 a non-aqueous electrolyte including an organic solvent and a perchlorate salt in
7 contact with the anode, the cathode and the separator.

1 29. The battery of claim 28, wherein the aluminum alloy is a 2000 series
2 aluminum alloy, a 6000 series aluminum alloy, or a 7000 series aluminum alloy.

1 30. The battery of claim 28, wherein the aluminum alloy is a 6000 series
2 aluminum alloy.

1 31. The battery of claim 28, wherein the aluminum alloy including 0-0.4% by
2 weight of chromium, 0.01-6.8% by weight of copper, 0.05-1.3% by weight of iron, 0.1-7%
3 by weight of magnesium, 0-2% by weight of manganese, 0-2% by weight of silicon, less than
4 0.25% by weight of titanium, 0-2.3% by weight of nickel, and 0-8.2% by weight of zinc.

1 32. The battery of claim 28, wherein the current collector is an expanded metal
2 grid.

1 33. The battery of claim 32, wherein the current collector has a yield strength of at
2 least 2.0 lb/in.

1 34. The battery of claim 32, wherein the current collector has a yield strength of at
2 least 5 lb/in.

1 35. The battery of claim 32, wherein the current collector has a tensile strength of
2 at least 5 lb/in.

1 36. The battery of claim 32, wherein the current collector has a tensile strength of
2 at least 7 lb/in.

1 37. A method of making a primary lithium battery comprising assembling a solid
2 cathode including a current collector including aluminum, an anode including lithium, and a
3 separator in a housing.

1 38. The method of claim 37, wherein the current collector includes a 1000 series
2 aluminum, a 2000 series aluminum alloy, a 6000 series aluminum alloy, or a 7000 series
3 aluminum alloy.

1 39. The method of claim 37, wherein the current collector includes a 6000 series
2 aluminum alloy.

1 40. The method of claim 37, wherein the current collector is an expanded metal
2 grid.

1 41. The method of claim 37, wherein the cathode includes a manganese dioxide, a
2 CF_x, iron disulfide, or a vanadate.

1 42. The method of claim 37, further comprising placing a nonaqueous electrolyte
2 in the housing.

1 43. The method of claim 42, wherein the nonaqueous electrolyte includes an
2 organic solvent.

1 44. The method of claim 42, wherein the nonaqueous electrolyte includes a
2 perchlorate salt.

1 45. A primary lithium battery comprising:
2 an anode including a lithium-containing anode active material;
3 a solid cathode including a current collector including an aluminum alloy and a
4 cathode active material including manganese dioxide in contact with the current collector;
5 a separator between the anode and the cathode; and
6 a non-aqueous electrolyte including an organic solvent and a perchlorate salt in
7 contact with the anode, the cathode and the separator.

1 46. The battery of claim 45, wherein the aluminum alloy is a 2000 series
2 aluminum alloy, a 6000 series aluminum alloy, or a 7000 series aluminum alloy.

1 47. The battery of claim 45, wherein the aluminum alloy is a 6000 series
2 aluminum alloy.

1 48. The battery of claim 45, wherein the aluminum alloy including 0-0.4% by
2 weight of chromium, 0.01-6.8% by weight of copper, 0.05-1.3% by weight of iron, 0.1-7%
3 by weight of magnesium, 0-2% by weight of manganese, 0-2% by weight of silicon, less than
4 0.25% by weight of titanium, 0-2.3% by weight of nickel, and 0-8.2% by weight of zinc.

1 49. The battery of claim 45, wherein the current collector is an expanded metal
2 grid.

1 50. The battery of claim 49, wherein the current collector has a yield strength of at
2 least 2.0 lb/in.

1 51. The battery of claim 49, wherein the current collector has a yield strength of at
2 least 5 lb/in.

1 52. The battery of claim 49, wherein the current collector has a tensile strength of
2 at least 5 lb/in.

1 53. The battery of claim 49, wherein the current collector has a tensile strength of
2 at least 7 lb/in.

1 54. The battery of claim 49, wherein the current collector has a yield strength of at
2 least 2.0 lb/in and a tensile strength of at least 5 lb/in.

1 55. The battery of claim 49, wherein the current collector has a yield strength of at
2 least 2.5 lb/in and a tensile strength of at least 7 lb/in.

1 56. A primary lithium battery comprising:
2 an anode including a lithium-containing anode active material; and
3 a cathode including a current collector including a 6061 aluminum alloy and a
4 cathode active material in contact with the current collector.

1 57. The battery of claim 56, wherein the cathode active material is a solid.

1 58. The battery of claim 56, wherein the cathode active material is a liquid.

1 59. The battery of claim 56, wherein the cathode active material includes SO₂ or
2 SOCl₂.

1 60. The battery of claim 56, wherein the current collector includes a pulled grid.

1 61. The battery of claim 56, wherein the current collector includes a leveled grid.

1 62. A method of making a primary lithium battery comprising assembling a solid
2 cathode including a current collector including an aluminum alloy, an anode including
3 lithium, and a separator in a housing.

1 63. The method of claim 62, wherein the current collector includes a 2000 series
2 aluminum alloy, a 6000 series aluminum alloy, or a 7000 series aluminum alloy.

1 64. The method of claim 62, wherein the current collector includes a 6000 series
2 aluminum alloy.

1 65. The method of claim 62, wherein the aluminum alloy including 0-0.4% by
2 weight of chromium, 0.01-6.8% by weight of copper, 0.05-1.3% by weight of iron, 0.1-7%
3 by weight of magnesium, 0-2% by weight of manganese, 0-2% by weight of silicon, less than
4 0.25% by weight of titanium, 0-2.3% by weight of nickel, and 0-8.2% by weight of zinc.

1 66. The method of claim 62, wherein the current collector is an expanded metal
2 grid.

1 67. The method of claim 62, wherein the cathode includes a manganese dioxide, a
2 CF_x, iron disulfide, or a vanadate.

1 68. The method of claim 62, further comprising placing a nonaqueous electrolyte
2 in the housing.

1 69. The method of claim 68, wherein the nonaqueous electrolyte includes an
2 organic solvent.

1 70. The method of claim 68, wherein the nonaqueous electrolyte includes a
2 perchlorate salt.